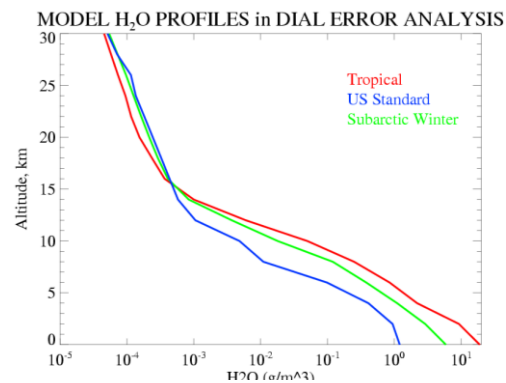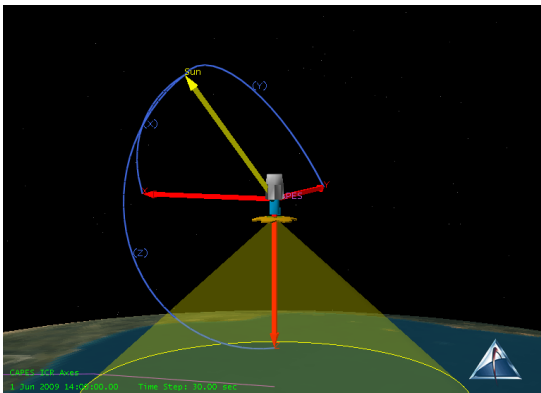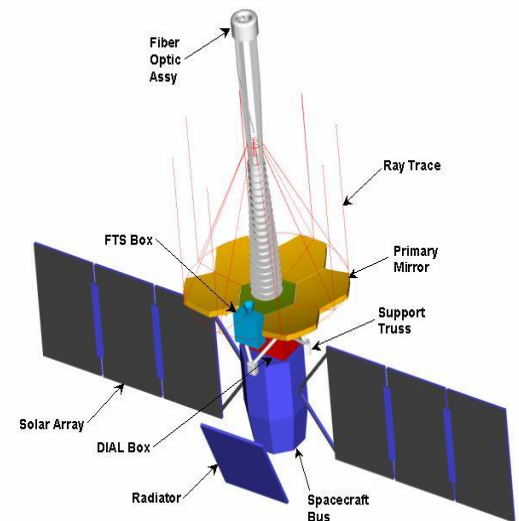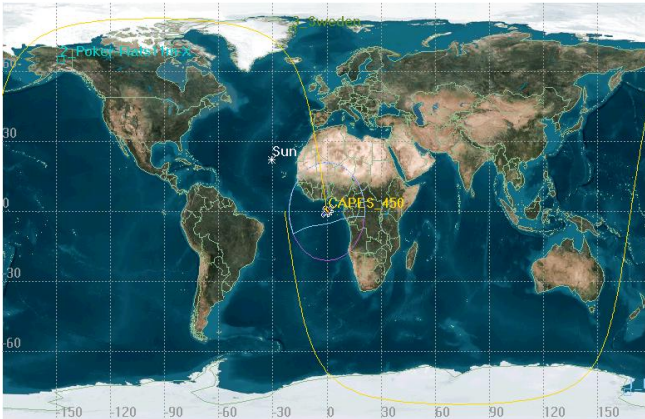Integrated Design Center
Operating Manual

The IDC is intended to allow improved linking of all software tools, as well as collaboration and knowledge sharing among team members.

Volume 1:   User's Guide
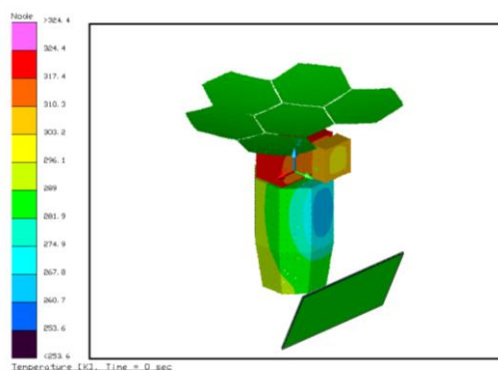
Langley Integrated Design Center (IDC) Procedures

IDC Procedures

To use the IDC

Request use of the facility from Pat Kerr or Jennifer Fortune.   Our web site is
http://idc.larc.nasa.gov. Facility can be reserved through your Nomad e-mail system on Center
(in the address book listing it is **LaRC-CR-B1209-R180)**.
The IDC team above will help in assembling the team for the sessions, based on the needed
disciplines, and defining the team leader or session facilitator.
In defining the team, make sure everyone agrees to the needed disciplines.
Timing:
IDC team can provide the best service, and the IDC will be the most effective, if we have 2
weeks notice to set up the study. This allows a week to formulate the team and set the schedule,
and a week to reconfigure the IDC, get users added to the IDC group, and start pre-work such as
meetings with the PI and development of early mechanical models.
A "normal" study might take 10 days (mornings only):
2 days in the first week for training on IDC process and tools
1 week of mornings-only, for the design session
1 day in the next week to accomplish the write-up
Obviously the time allotted for the study may vary based on the size and complexity of the work,
and may be more or less than this guide
Some projects may want to consider coming in for a second round, after there has been some off-
line work resulting from the first design session
Provide list of team members' LaRC logon names to allow them to be added to the IDC group.
Provide any software to be loaded on stations.
Define the product to be developed, and the schedule for using the facility.
Make sure all users read this manual and follow all procedures.
Currently there is no charge to use the IDC.
Studies, teams and projects using the full real-time collaboration capability of the facility take
priority in scheduling; however, if the facility is not being used, it may be used for other
activities such as team meetings, brainstorming session, reviews, etc. All rules in this manual
must still be followed, such as not changing the PC configuration or installing software.

Pre-work

A week of grounding or pre-preparation period will help the design session flow more smoothly.
This will give disciplines such as Mechanical, Payload, etc. time to agree on issues.
All members, including the facilitator, should be at the initial training session; team members
will be shown how to project via DICE on Web site, use OneNote, transfer files, etc.
Make sure everyone gets their login added to the group, and their software loaded, before the
training begins.
Station discipline experts should be asked as part of their pre-work to define what they will need
from other stations, and this will be one of the things covered in the training. As a start, each
station can be given their station's input/output file from one of the last sessions.
Team members can send their background information to Pat Kerr before the session starts, so
that they can be added to the discipline experts database for the IDC.

Team members' daily responsibilities

Log off or lock your computer when you leave the room. Remember that some proposal information is LaRC proprietary, and the same care must be taken to safeguard information on the stations in the IDC as you would use on your desktop PC.
Turn off your monitor when you leave the room to save energy.
Turn off all projectors when not in use or when the last person leaves the room. Lamp projector bulb lives are limited, so try to limit the on-time.

Responsibilities

PI

Science Investigator should be present for the initial session before formal design begins.
Concept of operations must be finalized (or close) during this period.
Subsystems experts must provide information during this period.
Principal scientist should be available at all times, at least by phone.
PI should have laptop or station projection capability.

Facilitator

At the start of the first session, go around the room for people to introduce themselves and say a little about their background and experience, so team members and the PI know who has had experience with what missions/discipline areas.
Facilitator needs to manage time in discussions, and set goals for off-line discussions. Set definite time goals for each session – need to say when rough operational concept will be ready, rough masses/powers, etc. Break the day into segments, to facilitate meeting time goals, and avoid long central discussions that could be taken off-line.
Go around the room and ask each station what they need to get started, and make sure they get it from whoever is the provider. Must go round the room (disciplines) at least twice a day, to see what people need and what their inputs are.
Facilitator should have prior experience in observing a collaborative design session, and must have discussed with IDC personnel and the PI what the expectations are.
Facilitator needs to be able to get to shared drive, and project, and control projection. (i.e. needs IP line, and projection line – could use IDC laptop).
After an initial baseline, if there are any tall poles identified (e.g., the cost for one specific subsystem), the facilitator in consultation with the IDC team may want to form a tiger team to take an independent look at the area of concern, outside the IDC sessions.

Discipline Stations

Every member must be able to discuss their own discipline. Contractors must have worked out proprietary issues before they get there. For any large component that is being purchased, there should be a direct line to a person who can answer technical and cost questions on the item, rather than having someone ask all those questions off-line. If having the contractor present is not possible, they should be present via telephone. If no direct contact with the contractor/vendor is possible, the LaRC CS contact must be fully prepared to directly answer all questions relating to the component.
Each station should have something to do at each moment, so that when science is being discussed that doesn't related to a certain station, they can still work effectively. The whole

point of the center is the power of parallel processing where all can be working together at the same time.

Each station has a discipline page in OneNote – if you want to see variables provided by others, simply click the tab for that discipline – e.g. 'Thermal'. Any data you write is instantly available to others in the session. Also, data is automatically saved, there is no need to save your discipline page.

All team members must be able get to the User's Guide (available on the home page of the IDC website at: http://idc.larc.nasa.gov) titled "LaRC_IDC_info_Volume_1_procedures" .

General

Set up laptops in advance to have all connections necessary, especially to project, and test them. Make sure people know how to set projection out monitor connector, so that laptops don't have to be restarted to project. Have the people bringing laptops get there at least 30 minutes early, or the day before, to test all connections.

Have documentation person to keep notes on discussion and agreements. If a permanent person is not brought in for this, allocate the responsibility during the training sessions, so that someone is responsible for it during each day of the project/study sessions.

If a session is starting at 9 am that means everyone should be in their seat with their station started by 9 am. This may mean arriving by 8:45 or so; earlier for laptops.

It is everyone's responsibility to define the basic need being addressed, goals, objectives, and requirements. In order to do this in an effective manner, we will use the LaRC Product Requirements Development and Management Procedure, http://lms.larc.nasa.gov/admin/documents/5526.pdf (check at http://lms.larc.nasa.gov 'Center Procedures' link and search for document # 5526).

IDC Staff

Help define team; the following disciplines should be considered for inclusion, depending on the study:

Mechanical Design
Electronics / Power Design / Instrumentation
Fabrication
Thermal analysis
Structural analysis
Optical analysis
Payload/detectors
Aero-heating analysis
Ablation analysis
CFD analysis / grid generation
Orbital/trajectory analysis
Software
Visualization/simulation
Data Visualization
Testing
Data Processing
GN&C, telecom, ground operations
Systems Engineering
Schedule

Risk
Costing
PI/Science
Project Management (it can help for them to have visibility at this point, if they are going to take it on later)
Make sure all members have ndc login added to IDC group.
Make sure all members know what software is on their station, and are asked if they need anything additional.
Arrange stations and Velcro signs.
Revise DICE configuration for station arrangement.
Make top-level folder in shared drive for project and load any existing documentation.
[Note here that OneNote liveshare must be started on lead or facilitator machine and must be open for liveshare duration].
Revise write-up template as necessary and place in project shared folder.

Computer use

Users must:
Have an NDC domain Windows login[*].
Have their names added to the IDC users group.
Users may not:
Install software on any PC, or change the projector configuration. If this is needed, check with Pat Kerr or the System Administrator for the IDC.

RULES:

Log off or lock your computer when you leave the room. Remember that some proposal information is LaRC proprietary, and the same care must be taken to safeguard information on the stations in the IDC as you would use on your desktop PC.
Turn off your monitor when you leave the room to save energy.
Stations should be turned off when a project has completed.
Keep files on the C:\ volume so that they will be automatically backed up. Files and folders outside this volume (such as D:\) **will not** be backed up.
Keep office files such as Word and PowerPoint files within C:\My Documents (the C: drive has roughly 28 GB), and large model or data files within D:\my_docs (the D: drive has roughly 130 GB available). To keep a clean organization for future work, it is recommended that a sub-folder in both of these locations be created on each PC used for each project/team.
To share information with others: A shared drive has been set up so that team members can make their information available to the entire team. To access this drive, in Windows Explorer use Tools…Map Network Drive and map \\idcsrv1\IDC_Share. For each team/project using the room, a folder with the name of that team should be created, and all shared information kept in that folder (and sub-folders as desired). To maintain organization, place your information within this folder, in a sub-folder named for your discipline.
You can access information from your office desktop machine (within the LaRC domain) by mapping it as a Network drive (using *your_desktop_PC _name*\c$ -- or d$). After you have

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[*] This is the best way to log into the stations. If a user does not currently have a LaRC domain login, any LaRC employee can request one from ODIN. If you have to log in locally, a local login on each machine is available.

mapped something as a Network Drive, it will show up in the dropdown box the next time you want to connect it (you won't have to type it in). To save time, when you access your desktop machine you may want to specify the whole address in the Map Network Drive box, such as *\\your_desktop_PC name*\c$\Documents and Settings*your_login*\My Documents.
Always disconnect Network connections when you are done with them, so you don't end up with multiples. The maximum number of simultaneous connections into a single machine is 10, so when everyone connects to the system shared drive at one time, it is maxed out on connections.

To add a printer as a printer for your station, do Start…Settings…Printers…Add Printer…Network Printer…Type in Printer Name.

All of the workstations are dual processor (ACER laptops at stations 4-6 are 2.16 GHz each, Lenovo laptops at stations 7-9 are 2.8 GHz. Dell ultra reduced form factor (URFF) computers at stations 1-3, 10-12 are 2.67 GHz each). These machine host names use IDC-# (where # is 1 through 12).

The best way to check email is to use Remote Administrator (see Instructions for Remote Admin below) to show your office PC desktop, and check your email on your office PC (so that everything stays in one place).

All PCs in the IDC have the ODIN Standard load, including MS Office Suite, FTP, and MS Internet Explorer. All also have OneNote (a program for linking and sharing files in near real time), as well as Remote Administrator. All also have specialized discipline software (see the file "IDC Workstations.xls" on the shared drive for current details).

Software can be installed on as many computers as necessary (or as we have licenses for), to make the project work as flexible as possible.   When software installations are planned, keep in mind the need to keep each piece of software updated when determining how many PCs to install on. Floating or site licenses are preferred -- only System Admin may install software.

Users are responsible for updating the IDC manuals for any changes they observe in the procedures, or modifications they recommend. We would like to make sure that both the user's manual (Vol. 1) and the detailed discipline instructions and interfaces (Vol. 2) are a good representation of how we do the work, so that future teams can more easily benefit from your lessons learned. Vol. 1 (IDC User's Guide) is available as an icon on each station's desktop. Both Vol. 1 and Vol. 2 reside on the shared drive in \IDC General. There are two ways to make edits. If you want to add a long section, you can write it and send it to either Louie or Ruth for later incorporation into the manual. If you have a minor edit, you can open the copy on the shared drive and make your edits, but please turn on Word Track Changes so that all can see what edits you have made (and let Ruth or Louie know).

Useful Web links :

http://accesstospace.nasa.gov – look at launchers, spacecraft, mission, etc
http://rsdo.gsfc.nasa.gov – Rapid Spacecraft Development Office; plug-and-play spacecraft design options
Unit converters:
http://webphysics.ph.msstate.edu/units/index.htm
http://www.digitaldutch.com/unitconverter/
http://www.onlineconversion.com/
http://www.matweb.com/tools/conversion.asp

DICE Web-based projector control panel

How to use

Start up Internet Explorer– the icon is the at the lower left of your screen.
Go to http://idcsrv1

Click on the station to be projected, then on the screen to be activated. This will turn on the selected projector, and project the selected station to the screen. The names of the stations can be changed as necessary in C:\dice\server\config.dat.

To shut own each projector, right-click on the screen image and select "Turn Off". To mute the video without turning off the projector, right-click on the screen image and select "Mute Video".

Always turn off projectors when leaving the room, or when unused, to save bulb life, and avoid heat generation.

Things to check when Portmaster not working:

Check Web page at idcsrv1 (on Internet Explorer) – any control?
Is Portmaster on?
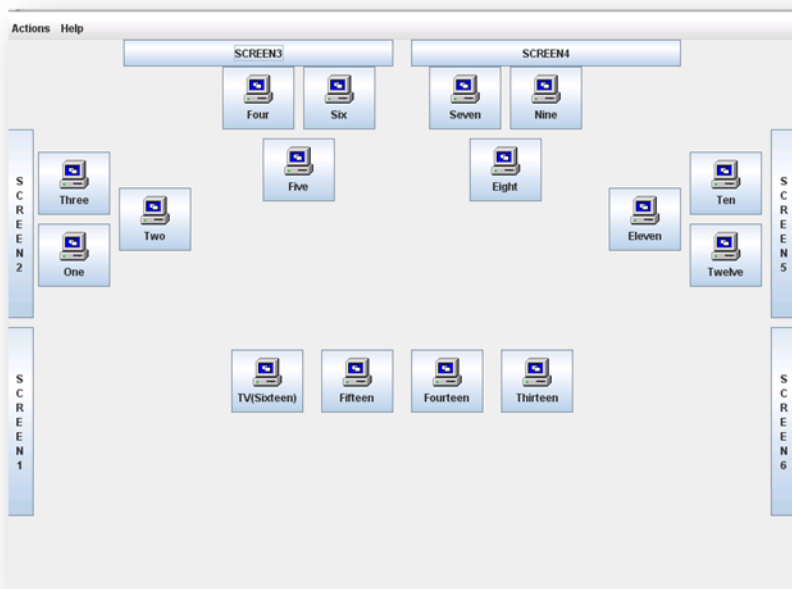
Check Apache services – {this step is only available to persons with administrator privileges on idcsrvl such as: Pat Kerr, Roger Bohnke, Tom Perry, Ken Detweiler) right-click on Apache Services and hit "Open Services". Check if DICE is running.

Check if c:/dice/conf/wrapper.txt is very large (about 4 Gigabytes). If so, delete this text file

Stop Dice services.
Power cycle the Portmaster switch.
Restart Dice services.
On idc-tablet{ the Dell laptop at the bottom of the lectern in the IDC} restart the IE browser.
DICE should come up and function

Fixing Portmaster (steps in sequentially more drastic order)
Reboot Portmaster (turn off then on with switch on back), and then have Roger or Louie reboot the server (idcsrv1).

Check cables out of back of Portmaster – one Ethernet to switcher, one octopus into [S1-S8]

Look at C:\dice\server\config.net

Pull up DOS command window
telnet to Portmaster
(telnet 146.165.196.166)
login as !root (see Roger or Louie for password)

Or, telnet directly to projector #1 by doing telnet 146.165.196.166 4451{IP address not verified per Panasonic replacement of Sanyo at #1 projector!}
When blinking cursor comes up, type
C0[RET]
 (will not be able to see it) -- should get response, and projector should turn on

Last-ditch desperate measure is to call DICE developer Andrew Geselbracht at JPL: 818 354-8327

External Laptops Video/screen projection
Any users can connect their video outputs to allow projection to the screen via the pigtails available on the main table. They are numbered 13-15.

External Laptops Network connection
Users within the same ndc domain (i.e. desktops or laptops are normally connected within building 1209) may connect laptops to the LaRC Ethernet lines on the center of the main table or at outlets flush with the floor arrayed throughout the room.
Warning. If non-resident machines are attached to the local network, it will disable the network connections for all users. External machines can connect to the wireless network – instruction sheets for wireless connections are posted in the room.

LaRC TV/Videoconferencing/webex.
Connection #16 is used for LaRC TV broadcast capability to the IDC with an additional VCR/DVD player installed. IP Videoconferencing capability is available, though advance set up

may be required in coordination with other Centers' firewall policies. The IDC maintains a Webex account for use by session participants as well.

Instructions for new Thermal Desktop users

For thermal users, after logging in to the thermal station for the first time, select
Start → Programs → Thermal Desktop → User Menu Setup
to activate Thermal Desktop menus within AutoCAD under your own login.

Instructions for Remote Admin / Remote Desktop Connection

Two programs are available to display a computer remotely. This can be used to view and work on your desktop computer from the IDC.

Remote Desktop Connection

For Windows XP, you use Remote Desktop Connection – Do All Programs → Accessories → Communication → Remote Desktop Connection. The computer you connect to needs to have that option enabled. To disconnect, close box on upper right. Can send Ctrl-Alt-Del to remote PC (to log out of remote PC) by doing Ctrl-Alt-End.
To enable this on your desktop, do Control Panel > System > Remote > Remote Desktop, "Allow users to connect remotely to this computer".

To use Remote Desktop (Windows XP only) to view your desktop screen:
Before first using this capability you must do a one-time enable:

One time enable:

1. Open ◪**System** in Control Panel.
2. Click the Remote tab, and then, under Remote Desktop, click **Allow users to connect remotely to this computer**.
3. Click **Select** Remote **Users**. If you are an administrator on the computer, your current user account will automatically be added to the list of remote users, and you can skip the next two steps.
4. In the Remote Desktop **Users** dialog box, click **Add**.
5. In the **Select Users** dialog box, do the following:
    - To specify the search location, click **Locations**, select the location you want to search, and then click **OK**.
    - In **Enter the object names to select**, type the name of the user you want to add, and then click **OK**.

   The name will be displayed in the list of users in the Remote Desktop Users dialog box.

   You must be logged on as an administrator or a member of the Administrators group to enable the Remote Desktop feature.

ICEMaker epilogue.

When the IDC machines were updated from Microsoft Office 2003 to Microsoft Office 2007, ICEMaker became unusable because of security issues with the Visual Basic scripts.

OneNote replaced ICEMaker

Microsoft OneNote allows improved functionality over ICEMaker, but is much easier to use.

With OneNote, all discipline stations can see each station's discipline data section pages. One machine initiates a livesharing session. Other stations join in, using the ip address:port + password combination generated for the session. Information in each discipline station's section is automatically updated to every station for the duration of the session.

OneNote_operation: step-by-step Start Live Sharing Session

The Lead Station (which can be any station) opens the OneNote section to be shared.
From the idc_share, navigate to your session folder. It should be here:
I:\IDC_Share\[Session_name] Folder\OneNote\[Session_name Data NoteBook]

Double click on the section {Discipline Data Sheets.one} to open

Lead station will initiate a live sharing session
From top menu in OneNote click
Share | live sharing session | Start sharing current session
OneNote will generate multiple IP address: port choices and lead will supply a password.
Use The IP address matching the host PC IP(The other IP address choices will not work in our environment). All other IDC machines can join the session.

OneNote_operation: step-by-step Join Live Sharing Session

All Other Stations (which can be any station) will open OneNote:.
Start | Programs | Microsoft Office 2007 | Microsoft Office OneNote 2007
OneNote will open with the last files open that were in the workspace. *You may close those to un-clutter the workspace.*
From top menu in OneNote click
Share | live sharing session | Join existing session
Fill in the IP address + port and password (that is provided by the Lead Station) to join.

The lead station ends the session:
 share | livesharing session | end session.
For all other stations, the sections are then read-only.
After the session ends you may save the sections to Word format (File | send to | Word)

Notes and Lessons Learned:
OneNote Livesharing has been used successfully in the three IDC sessions where it was employed.   In a live sharing session anyone can edit any page in a section any time – and multiple folks can edit the same page concurrently, please remember this when editing.
Data is transmitted nearly in real-time across a live-shared section.
When the pages in a section become shared, the tabs turn purple. Your non-active pages' tabs will flash when others are editing them.

You can only live-share one section at a time (A notebook is made up of multiple sections, a section is comprised of multiple pages). You do not explicitly save files in OneNote -   saves are automatic, and in fact there is no intrinsic save command in OneNote!   If you desire interim backups of your data during a livesharing session, the IDC recommends:
Do a 'save as' and save to Microsoft Word document format. If you attempt to do a save during a livesharing session in the native format (.one) you may causing syncing issues, and kill the live sharing session.

Livesharing a Notebook

In addition to livesharing a section, you can alternatively share a notebook, with these differences:
1. data is automatically synchronized every several minutes vs. seconds for livesharing a section

2. If livesharing a notebook, the notebook must be stored in a common file share.

File naming

Please name files using the name of the team/project, the discipline, the date, and any other identifying comments about the document. Documents in the Shared drive, especially, should have long and descriptive names.
At the conclusion of the study or project, a folder should be created in each discipline's folder on the shared drive, named "Final" that contains all final documents, results and reports.

Documentation

Final reports should be done in Word unless otherwise requested by the customer. Normally, the facilitator or IDC staff will release a template for each discipline to use in completing their writeup. The following guidelines should be adhered to by each report contributor.

Use NASA standards for captioning figures and tables. See
http://larcpubs.larc.nasa.gov/guidelines/elements/ for more information.

LaRC standard is:
- Figures are labeled below, in Sentence case, ending with a period.
- Tables are labeled above, in Title Case, with no period.

It is easiest to merge documents if everyone uses Word's automatic Insert...Reference…Caption feature for captioning figures and tables, as well as referencing them using the Insert... Reference…Cross-reference function. You can do this by selecting the figure, or all of the table, and doing right-click, and selecting "Caption". You can then select if you want a Figure or Table caption and type in the caption itself. Then, when you put the document together, everyone's figures and tables renumber correctly. It works best if no one positions their figures using floating, but all are in-line with text, so that when the text is merged, figures end up in the right place.

Table caption styles should be formatted "keep with next", as should all of the table except the last line, so tables don't break across pages. Figures will automatically be formatted "keep with next" when you caption them, so they don't get separated from the caption by a page break. This can be done automatically by using a different style for figures and tables, e.g., "Caption Figure", and "Caption Table". You can use the default "Caption" style for figures, and just change table captions to "Caption Table".

Tables can be broken across pages by using "Heading Rows Repeat" to make sure that lead rows in a long table show up on subsequent pages. Extremely large tables or figures can be put in their own section, oriented in landscape mode.

Heading styles are used for sections, so that a table of contents can be created easily, sections can be easily referenced, and the style of headings in the entire document can be changed at one time by simply changing the style. (Hot keys to do Headings: ctrl-alt-1 makes the line you are in Heading 1 Style, ctrl-alt-2 makes Heading 2 style, etc. Note: Hot key to do ° symbol: alt-248). Normal style is used for the body text, and this should be formatted with Space After 12 pt, so that people don't have to put in extra paragraph returns.

IDC Background

The LaRC Integrated Design Center (IDC) is a human and technology resource that provides a collaborative engineering facility for projects in all phases of design, from concept to flight. Skilled engineers and scientists utilize the IDC's collaborative process and sophisticated tools to produce detailed space mission, remote sensing instrument, and/or technology application designs.

This center allows members of a design team to come together for real-time design development in an integrated environment, where the methods for connecting their analyses and design methods are well formulated and well understood. The facility currently houses 12 high-end computer stations with software tools used by the discipline experts, projectors and audio-visual equipment to allow any six of the PC displays to be visualized on the wall simultaneously. Integration between the software tools is continually being improved.

There are two main objectives of the tool integration. One is that the preliminary development work that is done on a proposal will be integrated into the final design. This is done by using 3D, geometry- and physics-based tools ("high-end" tools) from the beginning of the design, rather than starting with "back-of-the-envelope" spreadsheet-based estimates. This is an integration over time, from concept through development to flight. This means that work done on a proposal is never wasted, and that work done on the design if the proposal is successful will start directly from the point where the proposal left off. The second intent is to allow the designers and analysts whose work is related to directly mesh their inputs and outputs. This is an integration between disciplines. Synergisms result from having both of these types of integration in one center. Integration between two analysis fields, such as aerodynamic entry ablation and thermal analysis, might be done for flight hardware development and then discovered to also be supremely useful for quick sizings in proposal development.

The IDC also focuses on having the people skills necessary in a real-time environment. This is in some ways returning full-circle to how work was in general done before computers were used; people involved in work came together to complete it in real-time. Since the advent of computers, people have tended to go back to their offices and work on their specific part of the effort in isolation. This leads to a loss of communication, and to re-design when work is done against outdated or unrealistic requirements. By bringing everyone involved in an effort together to work in real time, many design decisions can be made more quickly and effectively. Also, all members of the team develop an expertise in systems-level thinking, by seeing directly the impacts of one discipline on another. Having the customer present in the room for real-time negotiation of design requirements also helps avoid costly re-design and unrealistic requirements. By training experts in the mode of working, they can more easily make the transition to a fully distributed environment, where the work is done in real-time but at geographically distributed locations using virtual presence. The fully distributed environment is the goal of many current efforts that are looking toward results farther downstream. This near-term effort can be a good learning experience in working in this real-time integrated manner, starting with the easier task of working in real-time with local, familiar colleagues. With that experience in hand, the more difficult task of maintaining that work environment with far-flung colleagues will be facilitated.

The specialties at Langley involved in the IDC include design, fabrication, thermal analysis, structural analysis, optical analysis, CFD/aeroheating analysis, ablation analysis, orbital/trajectory analysis, costing, power/electrical, propulsion, guidance and control, and mission planning. The disciplines currently installed and operational on the IDC computers are shown in the Volume 2 of this document, and also in the file on the shared drive *"IDC Workstations.xls"*.

Lessons Learned

Definition of "requirements"

XXX need to add to this XXX   There is some disagreement about the definition of requirements stage, between the process as it is done at JPL, and the Systems Engineering process. This was an obstacle during the first pilot (CAPES). JPL (Knut Oxnevad) sets goals for the instrument, and then allows continual negotiation of the requirements with the science customer, during the design phase. The Systems Engineering Working Group process states that requirements must be defined up front. To have a smooth working process, this conflict must be resolved among the team.

Final Reports

Final report development will go much smoother if there is a template and specific instructions provided. One thing done at JPL is to actually have the team assembled to write the report, in the facility, which aids in maintaining consistency and ensures that the report will be done in a timely manner.

Lessons learned for IDC (in MSL RLIFE, week of March 29, 2004)

PI

Science Investigator must be present for the initial two-day session before formal design begins.
Concept of operations must be finalized or closed to being finalized during this period.
Subsystems experts must provide information during this period.
Principal scientist should be available at all times during this period, at least by phone.
PI must have laptop or station projection capability.

Facilitator

Facilitator needs to manage time in discussions, and set goals for off-line discussions.
Set definite time goals for each session – need to say when rough operational concept will be ready, rough masses/powers, etc. Break the day into segments, to facilitate meeting time goals, and avoid long central discussions that could be taken off-line.
Go around and ask each station what they need to get started, and make sure they get it from whoever is the provider.
Facilitator must have prior experience is observing a collaborative design session, and must have discussed with IDC personnel and the PI what the expectations are.
Facilitator needs to be able to get to shared drive, and project, and control projection. (i.e. needs IP line, and projection line – could use IDC laptop).
Must go round the room (disciplines) at least twice a day, to see what people need, and what their inputs are.

Pre-work

A week of grounding or pre-preparation period would help. This would give disciplines such as Mechanical, Payload, etc time to agree on issues.
All members, including the facilitator, should be at the training session; team members will be show how to project via DICE on Web site, use OneNote, transfer files, etc.
Make sure everyone gets their login added to the group, and their software loaded, before the training begins.

Stations

Have every member able to discuss their own discipline. Contractors must have worked out proprietary issues before they get there. For any large component that is being purchased, there should be a direct line to a person who can answer technical and cost questions on the item, rather than having someone ask all those questions off-line. If having the contractor present is not possible, they should be present via telephone. If no direct contact with the contractor/vendor is possible, the LaRC CS contact must be fully prepared to directly answer all questions relating to the component.
Give each station something to do; so that when science is being discussed that doesn't related to a certain station, they can still work effectively. The whole point of the center is the power of parallel processing where all can be working together at the same time.
Except for OneNote files which can be open and edited concurrently in a liveshare session, each station only opens their own files.   Make sure people understand what it means if they see "Can only be opened as 'Read-Only'" when they open a document. This has been added to User's Guide.
Make sure all team members know how to get to the User's Guide.

General

Set up laptops in advance to have all connections necessary, especially to project, and test them. <mark>Make sure people know how to set projection out monitor connector, so that laptops don't have to be restarted to project. Have the people bringing laptops get there at least 30 minutes early, or the day before, to test all connections.</mark>

Plan to have a documentation person attend to keep notes on discussions and agreements. If a permanent person is not brought in for this, allocate the responsibility during the training sessions, so that someone is responsible for it during each day of the project/study sessions.

Chairs are too crowded – move cables and computers to make it easier to have room for everyone.

If a session is starting at 9 am that means everyone should be in their seat with their station started by 9 am. This may mean arriving by 8:45 or so; earlier for laptops.

Station discipline experts should be asked as part of their pre-work to define what they will need from other stations, and this will be one of the things covered in the training. As a start, each station can be given their station's input/output file from one of the last sessions.

One big lesson learned in the first few sessions was how wide the variation is in people's understanding and skills with computers. Very few people know how to use Word and Excel effectively, map network drive, copy files, etc. Knowledge of LaRC standard for technical document writing was marginal. Many don't really understand the login and domain process, best way to save files, create directories, etc. For the team to work effectively, a training session on computer use is usually necessary. As a side benefit, everyone gets better at using their computers, and (hopefully) takes those new skills back to their own organizations.

Need 2 week prep time.

Invite Project Management to be present, if it is going to pass to them if won.

Software Tools Available
Table 1 shows an example of the software on each station for the initial pilot run in the IDC.

Table 1. LaRC IDC Disciplines and Software Tools

IDC Station	Tools
Software	MS Visio
	MS Visual Studio
Structural	PATRAN
	PATRAN Thermal
	NASTRAN
	SigFit
	PATRAN Materials Selector
Mech/CAD	Pro/E
Active Payload (Lasers)	STK
	ZeMAX
Passive Payload (Optic System, Detectors)	ZeMAX
	TracePRO
	STK
Avionics/Electronics	
Orbital/Environmental	STK
	PolyTrans
Telecom	Multi Mission Telecom Analysis Tool – MMTAT
	MatLab
	STK
	SPASIM
Thermal	PATRAN
	PATRAN Thermal
	Thermal Desktop / AutoCAD
	Fortran
	C++
Fabrication/ Testing	Pro/E
	Unigraphics
Optics	ZeMAX
	TracePRO
Mission/System, Customer/Science, Documentation	
Power	OrCAD via Windows 2000 terminal emulator
	JPL S/W -- MMPAT
All	Remote Admin, plus Standard ODIN load: MS Office suite, etc.

Current software loaded on each station is listed in "IDC Software List Sheets.doc" on the shared drive.